

## CLAIMS

We Claim:

1. An alternator comprising:  
an inner housing; and  
an outer housing mounted over said inner housing;  
said inner housing and said outer housing defining a flow chamber including a disk shaped first plenum extending diametrically across said alternator, an axial jacket extending annularly around said alternator, and a disk shaped second plenum extending diametrically across said alternator.
  
2. The alternator of claim 1 wherein said first plenum is defined by opposing first and second disk shaped portions of said inner housing, such that said first plenum is a disk shaped cavity extending diametrically across said alternator adjacent a rear end of said alternator, said axial jacket is defined by an inner diameter of said outer housing and an outer diameter of said inner housing, such that said axial jacket forms an annular jacket extending substantially around said alternator, and said second plenum is defined by a third disk shaped portion of said inner housing and a disk shaped front portion of said outer housing, such that said second plenum is a disk shaped cavity extending diametrically across said alternator adjacent a front end of said alternator.
  
3. The alternator of claim 2 wherein said axial jacket is disposed between and interconnects said first plenum and said second plenum, said first plenum, said axial jacket, and said second plenum being in fluid communication with one another.

4. The alternator of claim 3 further including an inlet extending from said first plenum adapted to allow coolant to enter said first plenum, and an outlet extending from said second plenum and adapted to allow coolant to exit said flow chamber.

5. The alternator of claim 4 wherein said inlet and said outlet are adapted to connect to a coolant system of an automobile such that engine coolant is circulated through said alternator.

6. The alternator of claim 4 further including an arcuate notch formed within said first disk shaped portion of said inner housing defining a first passageway interconnecting said first plenum and said axial jacket and an arcuate notch formed within said third disk shaped portion of said inner housing defining a second passageway interconnecting said axial jacket and said second plenum.

7. The alternator of claim 6 wherein said first passageway is located diametrically across from said inlet such that coolant entering said first plenum must flow diametrically across said alternator to reach said first passageway.

8. The alternator of claim 6 wherein said second passageway is located diametrically across from said first passageway, such that coolant entering said axial jacket through said first passageway must flow annularly around said alternator to reach said second passageway.

9. The alternator of claim 6 wherein said outlet is located diametrically across from said second passageway, such that coolant entering said second plenum through said second passageway must flow diametrically across said alternator to reach said outlet.

10. The alternator of claim 1 further comprising:  
a shaft rotatably supported within said inner housing by a pair of bearing elements, having a pulley mounted to a first end and a pair of slip rings mounted to a second end;  
a rotor assembly including first and second pole pieces mounted onto said shaft with an excitation winding mounted between said first and second pole pieces;  
a stator assembly fixedly mounted within said inner housing in functional engagement with said rotor assembly.

11. An alternator comprising:

an inner housing;

an outer housing mounted over said inner housing;

said inner housing and said outer housing defining a sealed flow chamber having a first plenum, an axial jacket, a second plenum, a first passageway interconnecting said first plenum and said axial jacket, a second passageway interconnecting said axial jacket and said second plenum, an inlet extending from said first plenum, and an outlet extending from said second plenum;

said first plenum being defined by opposing first and second disk shaped portions of said inner housing such that said first plenum is a disk shaped cavity extending diametrically across said alternator adjacent a rear end of said alternator,

said axial jacket being defined by an inner diameter of said outer housing and an outer diameter of said inner housing such that said axial jacket forms an annular jacket extending substantially around said alternator between and interconnecting said first and second plenums,

said second plenum being defined by a third disk shaped portion of said inner housing and a disk shaped front portion of said outer housing such that said second plenum is a disk shaped cavity extending diametrically across said alternator adjacent a front end of said alternator;

said first passageway being defined by an arcuate notch formed within said first disk shaped portion of said inner housing diametrically across from said inlet such that coolant entering said first plenum must flow diametrically across said alternator to reach said first passageway, and said second passageway being defined by an arcuate notch formed within said third disk shaped portion of said inner housing diametrically across from said first passageway such that coolant entering

said axial jacket through said first passageway must flow annularly around said alternator to reach said second passageway;

    said outlet being located diametrically across from said second passageway such that coolant entering said second plenum through said second passageway must flow diametrically across said alternator to reach said outlet.

12. The alternator of claim 11 wherein said inlet and said outlet are adapted to connect to a coolant system of an automobile such that engine coolant is circulated through said alternator.

13. The alternator of claim 1 further comprising:  
    a shaft rotatably supported within said inner housing by a pair of bearing elements, having a pulley mounted to a first end and a pair of slip rings mounted to a second end;  
    a rotor assembly including first and second pole pieces mounted onto said shaft with an excitation winding mounted between said first and second pole pieces;  
    a stator assembly fixedly mounted within said inner housing in functional engagement with said rotor assembly.